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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,270	12/05/2003	Albert A. Vierheilig	113222-132	1614
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WILMER CUTLER PICKERING HALE AND DORR LLP 399 PARK AVENUE NEW YORK, NY 10022				
			EXAMINER DOUGLAS, JOHN CHRISTOPHER	
			ART UNIT	PAPER NUMBER

1764

DATE MAILED: 10/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/729,270

Applicant(s)

VIERHEILIG ET AL.

Examiner

John C. Douglas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-121 is/are pending in the application.
- 4a) Of the above claim(s) 93-99 and 121 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-92 and 100-120 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-121 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/10/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-92 and 100-120, drawn to a catalytic cracking process, classified in class 208, subclass 113.
  - II. Claims 93-99 and 121, drawn to a composition, classified in class 502, subclass 84.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the composition can be used as a water-softening agent.
3. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Yung-Hoon Hu on 6/16/2006 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-92 and 100-120. Examiner reconsidered the original restriction between all 11 Groups and rejoined Group I with Groups 2-7 and 8-10. Affirmation of this election must be made by

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applicant in replying to this Office action. Claims 93-99 and 121 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-92, 100-120 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vierheilig (US 6028023).

10. With respect to claims 1, 2, 12, 17, 26, 30, 32, 40, 46, 53, 57, 62, and 72, Vierheilig discloses a material for use in a FCC process comprising, hydrotalcite-like compound with the formula  $(X^{2+}_m Y^{3+}_n (OH)_{2m+2n}) OH_n \cdot bH_2O$ , wherein  $X^{2+}$  and  $Y^{3+}$  are cations, m and n are selected such that the ratio of m/n is about 1 to about 10, a will have a value of 1, 2 or 3, b will range from 0 and 10, where the X is Mg, Ca, Zn, Mn, Co, Ni, Sr, Ba, Fe or Cu and the Y is Al, Mn, Fe, Co, Ni, Cr, Ga, B, La or Ce (see Vierheilig, column 12, lines 15-27). The compound being prepared by preparing a mixture of a divalent cation and a trivalent cation in an aqueous slurry, heating at a temperature of less than 250 degrees C to dry the compound to produce variable shaped bodies, heat treating the shaped bodies at a temperature between 300 and 850 degrees C, hydrating the heat treated compound to produce a hydrotalcite-like compound, and performing an optional drying step, where the hydrotalcite-like compound has an XRD pattern which has a 2 theta peak position nearly identical to ICDD card 35-965 (see Vierheilig, column 6, lines 44-51, column 8, lines 34-51, column 9, lines 49-55, column 10, lines 8-11, and

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column 19, lines 47-55). Also, Vierheilig discloses where the Hydrotalcite-like compound is used in an FCC catalyst to remove sulfur from petroleum (see Vierheilig, column 15, lines 16-27).

11. With respect to claims 3, 18, 33, and 47, Vierheilig discloses where the XRD pattern has a 2-theta peak position between 8 and 15 degrees (see Vierheilig, column 19, lines 47-61 and Figures 6 and 7).

12. With respect to claims 4, 16, 34, 44, Vierheilig discloses where the reaction mixture further comprises a metallic oxidant selected from the group consisting of platinum, palladium; rhodium, iridium, molybdenum, tungsten, copper, manganese, cobalt, iron, and ytterbium (see Vierheilig, column 24, claim 6).

13. With respect to claims 5, 19, 35, and 48, Vierheilig discloses where the amount of metallic oxidant is 15% (see Vierheilig, column 18, Table 1).

14. With respect to claims 6, 7, 20, 21, 31, 45, 63, 67, 73, Vierheilig discloses where the shaped bodies comprise a support comprising calcium aluminate (see Vierheilig, column 18, lines 16-42).

15. With respect to claims 8, 9, 22, 23, 36, 37, 49, 50, 58, 59, 68, and 69, Vierheilig discloses where divalent cation is Magnesium and the trivalent cation is Aluminum (see Vierheilig, column 1, lines 5-19).

16. With respect to claims 10, 11, 24, 25, 38, 39, 51, 52, 60, 61, 70, and 71, Vierheilig discloses where the divalent compound is magnesium hydroxide and the trivalent compound is aluminum acetate (see Vierheilig, column 1, lines 5-19).

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17. With respect to claims 13-15, 27-29, 41-43, 54-56, 64-66, and 74-76, Vierheilig discloses where the Hydrotalcite-like compounds are sorbents that comprise 10% of the FCC catalyst (see Vierheilig, column 16, lines 1-23).

18. With respect to claims 77-80, Vierheilig discloses where a Hydrotalcite-like compound is used in an FCC catalyst to remove sulfur from petroleum (see Vierheilig, column 15, lines 16-27) and where the Mg/Al ratio is between 2:1 to 5:1 and has an XRD pattern with a reflection at a two theta peak position at about 43 degrees and about 62 degrees (see Vierheilig, column 20, line 66 – column 21, line 6 and Figure 10).

19. With respect to claims 81-83 and 102, Vierheilig also discloses where the HTL compound is a dried or calcined shaped body (see Vierheilig, column 4, lines 25-35, column 10, lines 8-11, and column 18, lines 26-43).

20. With respect to claim 84, Vierheilig discloses where the Magnesium oxide is at least 52-wt% (see Vierheilig, column 18, Table 1).

21. With respect to claims 85-86, Vierheilig discloses where the reaction mixture further comprises a metallic oxidant selected from the group consisting of platinum, palladium, rhodium, iridium, molybdenum, tungsten, copper, manganese, cobalt, iron, and ytterbium (see Vierheilig, column 24, claim 6).

22. With respect to claims 87-89, 100, and 101, Vierheilig discloses where the support is made from zinc titanate (see Vierheilig, column 15, lines 46-61).

23. With respect to claims 90-92, Vierheilig discloses where the Hydrotalcite-like compounds are sorbents that comprise 10% of the FCC catalyst (see Vierheilig, column 16, lines 1-23).

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24. With respect to claim 103, Vierheilig discloses where the hydrotalcite like compound is a collapsed hydrotalcite like compound (see Vierheilig, claim 9).
25. With respect to claims 104, 106-108, 113-115, Vierheilig discloses where a Hydrotalcite-like compound is used in an FCC catalyst to remove sulfur from petroleum (see Vierheilig, column 15, lines 16-27) and where the Mg/Al ratio is between 2:1 to 5:1 and has an XRD pattern with a reflection at a two theta peak position at about 43 degrees and about 62 degrees (see Vierheilig, column 20, line 66 – column 21, line 6 and Figure 10 and MPEP 2144.05 I.).
26. With respect to claim 105, Vierheilig discloses heat treating the shaped bodies at a temperature between 300 and 850 degrees C (see Vierheilig, column 8, lines 34-51).
27. With respect to claims 109-111, Vierheilig discloses where the HTL compound is a dried or calcined shaped body (see Vierheilig, column 4, lines 25-35, column 10, lines 8-11, and column 18, lines 26-43).
28. With respect to claim 112, Vierheilig discloses where the Magnesium oxide is at least 52-wt% (see Vierheilig, column 18, Table 1).
29. With respect to claims 116 and 117, Vierheilig discloses where the reaction mixture further comprises a metallic oxidant selected from the group consisting of platinum, palladium, rhodium, iridium, molybdenum, tungsten, copper, manganese, cobalt, iron, and ytterbium (see Vierheilig, column 24, claim 6).
30. With respect to claims 118-120, Vierheilig discloses where the shaped bodies comprise a support comprising calcium aluminate (see Vierheilig, column 18, lines 16-42).



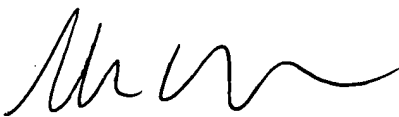
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

  
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